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## CRITICAL LIST OF MOLLUSKS COLLECTED IN THE POTOMAC VALLEY.

BY H. A. PILSBRY.

The mollusks enumerated in this paper were collected by Mr. J. E. Ives and the writer during the course of a pedestrian tour through parts of Pennsylvania, Maryland and West Virginia, in September, 1892. The route walked over was as follows: From Gettysburg, Pa., westward to the summit of South Mountain, thence southwest to Maryland, across the Cumberland Valley to Hagerstown, Md. From this point the Cumberland Pike (State road) was followed, with occasional slight deviations, westward to Cumberland, Md. From Cumberland, Mr. Ives proceeded to Luray, Va., across the multitude of ranges which traverse West Virginia. The writer returning to Philadelphia, stopping to collect at Cherry Run, on the Potomac River, in West Virginia.

On such a trip one is constantly tempted to stop by the wayside to examine or collect; and if he be possessed of that passion for collecting "specimens" which is the fatal birthright of most naturalists, these interruptions of the journey are likely to be many and long. The eye soon learns to recognize good collecting-ground; and the mere consideration that supper and a resting-place are miles farther on, is lightly esteemed when the charms and hidden possibilities of a wooded ravine weight the balance. The number of localities represented in this collection is therefore great, as would be expected from the above considerations. Probably almost all of the species of mollusks inhabiting Maryland, from the South Mountain to Cumberland, were found by us; and as the southern tier of counties in Pennsylvania is identical with Maryland in geologic and topographic features, the list practically tells what that portion of Pennsylvania contains of land and fresh-water shells. The list of a collection made by Mr. Witmer Stone at York Furnace, York Co., Pa., has been kindly furnished by him, and the species occurring there are noted herein.

The general topography and geology of these portions of Pennsylvania and Maryland are well known. South Mountain, the Blue Ridge, Martin's Mountain, Sideling Mountain, Town Ridge, Wills Mountain, and numerous smaller intermediate ridges, cut this district into a series of wide and narrow valleys, trending N. E. by S. W.;

each valley supplying a creek tributary to the Potomac. The valleys are mostly eroded anticlines, so that a great variety of strata are exposed; but sandy shales and shaly sandstones predominate.

The Potomac crosses this series of parallel ridges nearly at a right angle. It is everywhere shallow and rapids are frequent. At Cumberland it is dammed, and all the water which is not used by the city water-works feeds the Chesapeake and Ohio Canal, which has its western terminus here. Above the backwater from this dam it is a shallow rapid stream from forty to sixty feet wide, with a rocky, or in places, gravelly bed; and the low banks are fringed with graceful maple, willow and sycamore trees, often festooned with grape vines, and in places mingled with oak and locust. The water here is of a dark sepia tint, being stained by the spruce sawdust from saw-mills upon its upper course, and probably also by decaying laurel and bay leaves, for the region above is densely wooded. No mollusk life whatever could be found in this brown water, but minnows and tadpoles were seen. Below the dam at Cumberland the wide river-bed is dry, except for occasional pools, in which a few *Planorbis bicarinatus* and *Amnicola limosa* live.

Except in times of high water therefore, the lower course of the river is an entirely distinct stream from this upper reach. About ten miles below Cumberland the river has about the same volume as the stream above the influence of the Cumberland dam, and the water is clear.

Wills Creek, which flows through the city of Cumberland, is a swift stream with a rocky bed. The water is of crystal transparence, but no snails except *Planorbis bicarinatus* were found in it. Evitt's Creek, which drains the valley next eastward, contains *Anculosa* in abundance.

#### Family SELENITIDÆ.

This family differs from *Zonitide* in having the teeth of the radula all "aculeate," and in lacking pedal grooves above the foot-edges.

#### Genus SELENITES Fischer.

*Selenites concavus* Say.

Cumberland, Allegheny County, Md., 64,679. Morgan County, W. Va., opposite Hancock, 64,678. It has been taken by Mr. W. Stone at York Furnace, York County, Pa., and by Mr. C. W.

Johnson in Fulton County, Pa. It occurs over nearly the whole of eastern North America.

#### Family ZONITIDÆ.

A complete rearrangement of the American genera of this family is necessary, and although a local faunal list may be considered hardly the place for radical changes in nomenclature, still it may be preferable to the perpetuation of an untenable system. The species which were formerly referred to the genus *Zonites* will now be distributed into several genera, distinguished by important structural peculiarities.

The genus *Zonites* of Montfort has no representative in America, being confined to the circum-Mediterranean and adjacent faunas. In this genus the shell is large, solid, opaque and discoidal, and is always strongly carinated, at least when young. The jaw has a strong median projection; the genitalia lack all accessory organs, being of the haplogonous type. The synonymy of the genus is as follows:

1810.—*Zonites* Montfort, Conchyliologie Systématique, II, p. 282.

Type *H. algira* L.

1833.—*Ægopsis* Fitzinger, Syst. Vers, p. 99. *H. verticillus*.

1837.—*Tragomma* Held., Isis, p. 916. *H. acies* Partsh.

1847.—*Helicodes* Dumas, Comp. Rend., XXV, p. 113. *H. algira*.

1849.—*Helicella*, in part, of Férussac, Prodrôm. and of Risso, Hist. Nat. Eur. Mérid., IV, p. 68 (1826), and of Beck, Index (1837).

1855.—*Verticillus* Moq.-Tand. Hist. Nat. Moll. Fr., p. 91. *Z. algirus*.

Not *Zonites* of American authors!

#### Genus OMPHALINA Rafinesque.

*Omphalina* Raf., Enumeration and Account of some remarkable Natural Objects in the cabinet of Prof. Rafinesque, in Philadelphia, p. 3. November, 1831. (Type *O. cuprea* Raf., = *H. fuliginosa* Griff.). Binney & Bland, Land and Fresh-water Shells of N. A., p. 283. 1869. Tryon, Amer. Journ. Conch., II, p. 247. 1866. V. Martens, Biol. Centr. Amer., Mollusca, p. 104. 1892.

*Mesomphix* (in part), Beck, Index Moll. p. 7. 1838.

*Neozonitina* Pfeffer, in Strebel's Beitr. Mex. Land u. Süss-W. Conch., IV, p. 1. 1880.

*Edusa* Alb., Die Heliceen (2), p. 72. 1860. (Type *H. zonites* Pfr.).

*Moreletia* Gray, Pulm. Brit. Mus., p. 148. 1855. (Type *H. euryomphala* Pfr.).

*Zonyalina* Martens, Mal. Bl., 1865, p. 16. (Type *H. bilineata* Pfr.).

*Patulopsis* Strebel & Pfeffer, l. c. (Type *P. carinatus* Str.)

*Zonites*, s. g. *Mesomphix* Binney, Terr. Moll., V, p. 98. 1878.

The generic characters of this group are as follows:

Shell rather large and solid but thin, umbilicated, smooth below, lacking teeth or folds within; the lip simple and sharp.

Foot double grooved above its margin, the grooves meeting above the tail in a mucus pore; sole tripartite; dorsal surface from head to mantle entirely lacking longitudinal grooves.

Genital system lacking dart sac and other accessory glands. See under *O. fuliginosa*, below.

This genus contains the large Zonitoids of North America. It has not been recognized as yet in Palæarctic regions.

***O. fuliginosa*** Griff. Pl. 1, fig. 5.

York Furnace, York County, Pa., 63,857. Collected by Witmer Stone. No specimens were found by us in Maryland.

The genital organs of this species and its allies seem to have been misinterpreted by writers on United States forms, who have mistaken the swollen base of the vas deferens for the penis, and have considered the penis itself to be a dart sack or prostate gland of some sort.

In *O. fuliginosa*, the penis (*P.*), is a rather short stout sac, with the retractor muscle (*r. p.*) inserted at its apex, and attached distally to the floor of the lung. Internally the distal half of the cavity of the penis is densely, finely and rather sharply granulated; the opening of the vas deferens is near the apex of the cavity, and is not provided with a papilla. The lower portion of the vas deferens (*v. d.*) is enormously swollen; and for a short distance from its insertion it is firmly bound to the penis itself.

The vagina (*vag.*) is curiously swollen near the base. The spermatheca (*sp.*) is large, subglobular, and together with its rather long duct, is bound firmly to the oviduct. The albumen gland (*a. gl.*) is uncommonly large.

The figure is drawn from a specimen collected by Mr. Witmer Stone at York Furnace, York County, Pa. (No. 63,857). Several

individuals from different localities were examined and found to agree in the characters described.

Genus **VITREA** Fitzinger.

- (1817.—Not *Hyalina* Schumacher, Syst. Vers. Test., p. 234, belongs to *Marginellidae*).
- 1819.—S. g. *Helicella*, *Les Aplostomes*, \*\* *Les Hyalines*, *Hyalinæ*, Férussac (includes the European translucent zonitoids and many exotic species of various genera).
- (1820.—Not *Hyalina* Studer, Syst. Verzeich. Schweiz Conch., p. 11, = *Vitrina* Drap. 1805).
- 1833.—*Vitrea* Fitzinger, Syst. Verzeich., p. 99.
- 1833.—*Oxychilus* Fitz., l.c., p. 100, in part, not *Oxycheila* Dejean, 1825.
- 1837.—*Hyalinia* Agassiz, in Charpentier, Nouv. Mém. Soc. Helv., i., p. 13.
- 1837.—*Polita* Held., Isis, p. 916 (proposed for *cellaria* Müll., *glabra* Stud., *nitens* Mich., *nitidula* Fir., *lucida* Dr., *nitidosa* Fér., *clara* Held., *lenticularis* Held., *crystallina* Müll., *hyalina* Fér., *contorta* Held., *fulva* Müll.).
- 1854.—*Lucilla* Lowe, Proc. Zool. Soc. Lond., p. 177, type *H. cellaria*, Müll.
- 1854.—*Crystallus* Lowe, Proc. Zool. Soc. Lond., p. 178, type *H. crystallina* Müll.
- 1855.—*Aplostoma* Moq.-Tand. Hist., Nat. Moll. France, II, p. 72. (Includes *nitidus*, *olivetorum*, *lucidus*, *cellarius*, *glaber*, *allivrinus*, *nitidulus*, *nitens*, *striatulus*, *purus*, *crystallinus*).
- 1857.—*Euhyalina* Albers, Malak. Blätter, IV, p. 91, type *H. cellaria*.
- 1879.—*Aegopina* Kobelt, Iconogr. Eur. Landund Süßwasser Moll., VI, p. 15 (proposed as a substitute for *Mesomphix* of European authors, not of Rafinesque. Type *H. olivetorum* Gm.).
- 1880.—*Diaphanella* Clessin, Mal. Bl. (n. F.), II, p. 206, type *H. diaphana* Stud.
- 1880.—*Mediterranea* Clessin, l. c. type *H. hydatina* Rossm.
- 1886.—*Hydatina* Westerlund, Fauna, etc., p. 37, type *H. hydatina* Rossm.
- 1886.—*Anomphala* West., l. c., p. 29, types *parthenica* and *diaphana*.
- 1891.—*Vitrea* Fitz., E. A. Smith, Journ. of Conch., VI, p. 337, 339.
- 1892.—*Glyphyalinia* Martens, Biol. Cent. Amer., Mollusca, p. 117. (*H. indentata* Say, etc.). *Zonites* of many authors, not of Montfort.

This genus consists of small glassy zonitoid snails having no ac-

cessory organs developed upon the genital system, differing in this respect from the *Zonitoides* section of *Gastrodonta*. The type of *Vitrea* is *H. crystallina* Müller of Europe. There are a great many generic synonyms, but part of the names quoted above are available for sectional divisions. The American species must all be examined to ascertain whether or not they possess a dart sac, as those having this structure must be removed to the genus *Gastrodonta*. I have not had time to examine the soft parts of any of them.

**V. arborea** Say.

Monterey, Franklin Co., Pa., 64,696, S. E. cor. Franklin Co., Pa., near Maryland line, 64,693. Foothills of Martin's Mt., Md., 64,694. Morgan Co., W. Va., opposite Hancock, 64,695. Also collected at York Furnace, York Co., Pa., by Witmer Stone.

**V. electrina** Gld.

Summit of North Mountain, west of Clear Spring, Washington Co., Md., 64,836. Monterey, Franklin Co., Pa., 64,839.

**V. (Glyphyalinia) indentata** Say.

Monterey, Franklin Co., Pa., 64,838. Summit of North Mountain, west of Clear Spring, Md., 64,837. Morgan Co., W. Va., opposite Hancock, 64,692. Also York Furnace, York Co., Pa. (Stone).

**Genus GASTRODONTA** Albers.

1850.—*Gastrodonta* Alb., Die Heliceen, p. 88.

1857.—*Gastrodonta* Alb., Mal. Bl. IV, p. 91, type *H. interna* Say.

1862.—*Zonitoides* Lehmann, Mal. Bl. IX, p. 111, type *Z. nitidus* Müll.

1864.—*Pseudohyalina* Morse, Terr. Pulm. Me., p. 15, (for *H. exigua*, *minusecula*, *limatula*, etc.).

1869.—*Ventridens* Binney and Bland, Land and Fresh-water Shells of N. A., I, p. 292 (proposed for *H. gularis* and *H. suppressa* Say).

The shell is provided with internal teeth or lamellæ in the typical forms of this genus. In another group, consisting of *G. ligera* and its allies there are no teeth, but a strong white callus upon the floor of the last whorl. In the section *Zonitoides* this callus is wanting, and the whorls are rounded below.

The prominent feature of the genitalia is the presence of a dart sac containing a long curved calcareous dart, situated upon the va-

gina; and this is the most important generic character. In Pl. I, fig. 4, is shown the dart of *G. ligera*, magnified twelve diameters.

There are strong reasons for believing that the presence of a dart, the coronal glands being correlated with it, is a very old character in *Zonitidæ*, and that it was present in the undifferentiated stock from which nearly all the existing genera have diverged.<sup>1</sup> If this be true, then *Vitrea*, *Omphalina*, etc., must be regarded as secondarily haplogonous, having lost the dart apparatus which was present in their ancestors.

***G. suppressa* Say.**

Gettysburg, Adams County, Pa., 64,083. Monterey, Franklin County, Pa., 64,087. Also at York Furnace, York County, Pa. (Witmer Stone). In Maryland at Cave Town, 64,084, and Summit of North Mountain, 64,080; Martin's Mountain, 64,680, between Green and Polish Mts., 64,682. Cumberland, Allegheny Co., 64,685, and Morgan Co., W. Va., opposite Hancock, 64,681.

***G. ligera* Say.**

All of the specimens were small, shining and smoother than usual, measuring about 11 mm. in diameter, the umbilical perforation minute, about .3 mm. wide. Gettysburg, Pa., 64,697. Chewsville, Washington Co., Md., 64,690. Ten miles west of Hancock, Md., 64,689; Cumberland, Allegheny Co., Md., 64,688.

**Family ENDODONTIDÆ.**

**Genus PYRAMIDULA Fitzinger.**

The generic names used in this paper for *Helices* are fully explained in the writer's guide to the *Helices*, now being published.

***P. alternata* Say.**

Chewsville, Washington Co., Md., 64,698. Martin's Mountain, Md., 64,699, 64,700. West Virginia, opposite Hancock, Md. Cumberland, Md., 64,697. Collected by Stone at York Furnace, York Co., Pa.

***P. striatella* Anth.**

Hanover, York Co., Pa., 64,703. A delicate, fine-ribbed form.

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<sup>1</sup> Perhaps excepting *Conulus*, *Microcystis*, etc.



The southeastern limit of distribution of this species is still to be mapped.

**P. perspectiva** Say.

Cumberland, Md., 64,702. Morgan Co., W. Va., opposite Hancock, 64,701. The specimens from Cumberland are uncommonly coarse-ribbed. Morgan County is probably the eastern limit of distribution for this species.

**P. lineata** Say.

Gettysburg, Adams Co., Pa., 64,705. Monterey, Franklin Co., Pa., 64,704.

**Family HELICIDÆ.**

**Genus POLYGYRA (Say 1818) Pils. 1889.**

*Polygyra* Say, 1818 + *Mesodon* Raf., 1831, + *Stenotrema* and *Triodopsis* Rafinesque, 1819.  
*Neohelix* v. Ihering, 1892.

**P. hirsuta** Say.

The specimens from this region are all small, measuring from 6 to 6.5 mm. diameter, and 4 to 4.5 mm. height. Monterey, Franklin Co., Pa., 64,731. Cave Town, Wash. Co., Md., 64,732. Summit of North Mountain, west of Clear Spring, Washington Co., Md., 64,729. Martin's Mountain, 64,730. Between Green and Polish Mts., 64,726. Cumberland, Allegheny Co., Md., 64,724. Morgan Co., W. Va., opposite Hancock, 64,728. Found by Stone at York Furnace, York Co., Pa.

**P. monodon** Rackett.

Gettysburg, Adams Co., Pa., 64,739. Monterey, Franklin Co., Pa., 64,740. Cave Town, Washington Co., Md., 64,738. Between Green and Polish Mts., Md., 64,726. Martin's Mountain, 64,736. Cumberland, Md., 64,735. Morgan Co., W. Va., opposite Hancock, 64,737. The specimens from Pennsylvania would fall under the "variety" *fraterna*, having the umbilicus wholly closed. This species was collected by Stone at York Furnace, York Co., Pa.

**P. thyroides** Say.

Ten miles west of Hancock, Md., 64,712. West Va., opposite Hancock. Cumberland, Md., 64,711, abundant. Like Philadel-

phia specimens, these have a wide range of variation in size and degree of closure of the umbilicus. Seven out of the nine adults preserved from Cumberland, have developed a strong parietal tooth. Collected by Stone at York Furnace, York Co., Pa.

***P. albolabris* Say.**

Monterey, Franklin Co., Pa., 64,707, large (31 mm. diam.), solid and dark colored. Cave Town, Washington Co., Md., 64,708, small, (26 to 28 mm. diam.) and solid. Fairview, top of North Mountain, Md. Foothills, 64,706, and summit, 64,709, of Martin's Mt., Allegheny Co., Md., small specimens. Cumberland, Md., 64,710, large and solid, measuring 32 mm. diameter. West Virginia, opposite Hancock, Md.

It is curious to note that the specimens from Franklin Co., Pa., collected in a porphyritic region, should markedly exceed in size those from Cave Town and Martin's Mountain, Md., tracts rich in limestone, the soil being mainly formed by its disintegration. The smallest specimens (22 mm. diam.) were collected at the foot of Martin's Mountain. Stone collected this species at York Furnace, York Co., Pa.

***P. palliata* Say.**

Cumberland, Md., 68,713, typical. Collected also by Stone at York Furnace, York Co., Pa., where he found it only in hemlock woods. In the Catskill Mountains I have found it under the loose bark of fallen hemlock boles.

***P. tridentata* Say. Pl. 1, Fig. 7.**

Cumberland, Md., 64,714. Typical specimens in every respect, measuring 13 mm. in diameter. Also found in Morgan Co., W. Va., opposite Hancock, 64,715. In both localities associated with *P. fraudulenta*.

It must be distinctly understood that Say's types of this species were the small forms found in the "Middle States." Say describes it as "half an inch wide." He afterward collected the large form in the Ohio basin, referring it to the same species. This large form should be regarded as a geographic race. In Terr. Moll., III, the typical form is figured on Pl. XXVII, side figures, and the large race is shown in the upper, lower and central figures of the same

plate. Binney's wood-cuts (Man. Amer. L. Sh. etc.) represent the large form from Ohio.

**P. tridentata juxtidentis** n. var. Pl. 1, Fig. 8.

Cave Town, Md., 64,720; very numerous in stony places. This is a limestone region, and the red soil is largely the result of limestone decomposition. The same form of *Triodopsis* was found at Gettysburg, Pa., 64,719, and in Allegheny Co., Md., between Green and Polish Mountains, 64,716, Chewsville, Md., 64,717, at Fairview, summit of North Mountain, Md., and in Morgan Co., W. Va., opposite Hancock, 64,718. It is common around Philadelphia, where typical *tridentata* also occurs.

This form is distinguished from typical *tridentata* by the lower position of the upper lip-tooth, the latter part of the parietal lamella being directed toward this tooth or to a point above it, whilst in the type the lip-teeth are more separated and the latter portion of the parietal lamella is directed toward a point on the peristome between them. The variety is more coarsely striated also. The number of whorls (5) is the same in variety and type. The measurements of three individuals are as follows:

Alt.	7	diam.	14	mm.	(Philadelphia).
"	6 $\frac{3}{4}$	"	13 $\frac{1}{2}$	"	(Cave Town, Md., largest).
"	6	"	11	"	( " " " smallest).

The upper lip-tooth is sometimes broader than the lower, and occasionally a trifle "inflected." The parietal blade is slightly arcuate.

**P. tridentata fraudulenta** n. var. Pl. 1, Fig. 6.

Morgan Co., W. Va., opposite Hancock, Md., 64,724 and 64,725; Cumberland, Md., 64,723. At both of these localities it is found living with typical *P. tridentata*.

In its typical development this variety is a compact shell of a reddish-brown color (varying to white in some localities); the spire is low-convex, composed of six closely coiled whorls, the last being notably deflexed in front and strongly constricted behind the lip. The aperture is strongly "dished" or basin-shaped; the outer lip bears a broad tongue-shaped inflected tooth, situated at the position of the periphery of the shell. The middle of the basal lip bears a small squarish tubercle, which is often laterally compressed. The parietal

wall bears an elevated oblique blade which is typically almost straight and never much curved.

Alt.  $8\frac{1}{2}$  diam.  $16\frac{1}{2}$  mm. (No. 64,725).

"  $6\frac{1}{2}$  " 13 " (No. 64,723).

The tooth upon the outer lip is generally bifid. Binney's figures of *Triodopsis fallax* (Man. Amer. L. Sh., p. 292, fig. 314) represent a form of this subspecies, but not its typical development. That this is not the true *H. fallax* of Say will be evident to anyone comparing it with the original description. The characters of the two are best shown in the following table :

**P. fraudulent.**

Spire moderately convex.

Whorls six.

Parietal tooth straight or nearly so.

Diameter 13 to 17 mm.

Habitat : Cumberland Mountain system, extending northward along the mountains to Maryland and westward throughout the Ohio Valley.

**H. fallax, Say's description.**

Spire convex, higher than in *tridentata*.

Whorls five.

Parietal tooth "curving downwards."

Diameter  $11\frac{1}{2}$  mm.

Locality, "vicinity of Philadelphia."

No shells exhibiting the characters of *fraudulenta* have been found in the cis-Alleghenian region of eastern Pennsylvania or New Jersey, so far as I can judge by the collections of Philadelphia conchologists, which cover a great many localities and a long series of years. This region is inhabited by typical *tridentata*, its variety *juxtidentens*, and by the "*H. introferens*" of Bland and authors generally.

**P. fallax Say.**

Gettysburg, Pa., 64,722. The variations of the *tridentata* group of *Triodopsis* are an extremely intricate study, and strange as it may seem, the names hitherto attached to some of the forms require revision. *Helix fallax* was described by Say from the vicinity of Philadelphia; but the form heretofore so called is not found near Philadelphia, nor has it been within the present century, if ever. The *Triodopses* found in this vicinity are (1) *P. tridentata* Say, typical; (2) *P. tridentata juxtidentens*; and (3) *P. introferens* Bland. These three forms are represented in the collection of the Academy by speci-

mens collected many years ago as well as by others taken during the past year; and no other forms or species have to my knowledge been found anywhere near Philadelphia.

The conclusion that one of these three is the *fallax* of Say is therefore an extremely probable one. Upon turning to Say's original description (Journ. Acad. Nat. Sci., V, p. 119) we find that it applies exactly to the shell known as *Helix introferens* Bld. Say mentions the parietal tooth "curving downwards so as to nearly reach the termination of the labrum" and says: "This resembles the *tridentata* nob., but the upper tooth of the labrum is much inflected, the spire is more elevated, and the size is less considerable." He gives the diameter as "nine-twentieths of an inch," which is exactly the size of the Philadelphia "*introferens*." It should be added that Say's types of *tridentata* and *fallax* are no longer in existence. In view of the facts of the case, it seems to me necessary to use Say's name *fallax* for the species hitherto called *introferens*, the latter becoming a synonym.

The prominent features of this shell, besides its elevated spire and and inflected upper tooth, are the angular curvature of the parietal tooth, and the continuation inward of the basal tooth and the callus around the "profound sinus" between the two lip-teeth.

**Genus STROBILOPS Pilsbry.**

*S. virgo* Pilsbry.

Near Monterey, Adams Co., Pa., 68,835.

**Family PHILOMYCIDÆ.**

**Genus PHILOMYCUS (Raf.) Fér.**

*P. carolinensis* (Bosc.) Fér.

Southeastern slope of North Mountain and Cumberland, Md.; Monterey, Pa. Stone collected it at York Furnace, York Co., Pa. Also seen at Fairview, summit of North Mountain, Md.

*P. pennsylvanicus* Pilsbry, n. sp.

A maculated species having the jaw strongly ribbed. It is smaller and less distinctly marked than *P. carolinensis*. Full description with anatomical details will be given later.

York Furnace, York Co., Pa. (Witmer Stone!). South Mountain, near Pa. and Md. State boundary.

**Family PUPIDÆ.****Genus LEUCOCHILA Martens.****L. fallax** Say.

Cave Town, Washington Co., Md., 64,786; Martin's Mountain,  
Allegheny Co., Md., 64,785.

**Genus PUPA Drap.****Subgenus Bifidaria Sterki.****P. armifera** Say.

Gettysburg, Pa., 64,783. Cave Town, Md., 64,784.

**Section Vertigopsis Sterki.****P. pentodon** Say.

Green and Polish Mts., Allegheny Co., Md., 64,787.

**Genus VERTIGO Müller.****V. ovata** Say.

Green and Polish Mts., Allegheny Co., Md., 64,840.

**V. edentula simplex** Gld.

Was collected by Witmer Stone at York Furnace, York Co., Pa.

**Family SUCCINEIDÆ.****Genus SUCCINEA Draparnaud.****S. obliqua** Say.

Morgan Co., West Virginia, opposite Hancock, 64,734.

**S. avara** Say.

Monterey, Franklin Co., Pa., 64,733.

**S. ovalis** Gld.

Was collected by Witmer Stone at York Furnace, York Co., Pa.  
We did not find it in Maryland.

**Family LIMNÆINÆ.****Subfamily Limnæinæ.****Genus LIMNÆA Lam.****L. desidiosa** Say.

Conecocheague River, Md., 64,802. Patterson's Creek, Mineral

Co., West Virginia, 64,803. Found by Mr. Stone at York Furnace, York Co., Pa., where *L. humilis* Say, *L. columella* Say and *L. caperata* Say also occur.

#### Subfamily Planorbinæ.

##### Genus PLANORBIS Guet.

###### *P. trivolvis* Say.

Canal at Hancock, Md., 64,800, also York Furnace, York Co., Pa. (Stone).

###### *P. bicarinatus* Say.

Gettysburg, Pa., 64,795. Conococheague River, Md., 64,798. Potomac R., at Hancock, Md., 64,794. Flintstone Creek, Flintstone, Md., 64,788. Evitts' Creek, near Cumberland, Md., 64,793. Cumberland, Md., 64,792. Patterson Creek, Mineral Co., W. Va., 64,791. S. Branch Potomac R., 4 miles from Romney, W. Va., 64,797. Warm Spring Creek, Morgan Co., W. Va., opposite Hancock, 64,796. North River, Sedan, Hampshire Co., W. Va., 64,790. Potomac River at Cherry Run, W. Va., 64,789. South Fork Shenandoah River, near Luray, Va., 64,799. Also York Furnace Pa. (Stone).

Throughout this region *P. bicarinatus* and *Physa heterostropha* are ubiquitous aquatic species.

###### *P. parvus* Say.

Canal at Hancock, Md., 64,801. Also York Furnace, Pa. (Stone), with *Segmentina armigera*, Say.

#### Subfamily Ancylinæ.

##### Genus ANCYLUS Goeff.

###### *A. rivularis* Say.

Piny Creek, Gettysburg; Pa., 64,804. Between Green and Polish Mts., Allegheny Co., Md., 64,805. Warm Spring Creek, Morgan Co., W. Va., 64,806.

#### Family PHYSIDÆ.

##### Genus PHYSA Drap.

###### *P. heterostropha* Say.

Gettysburg, Pa., 64,814. Conococheague River, Washington

Co., Md., 64,808. Potomac River at Hancock, Md., 64,810. Town Creek, Allegheny Co., Md., 64,807. Flintstone Creek at Flintstone, Md., 64,815. Evitt's Creek, near Cumberland, Md., 64,816. Potomac River, 3 miles below Cumberland, 64,811. Patterson's Creek, Mineral Co., W. Va., 64,812. Potomac River, at Cherry Run, W. Va., 64,813. A small creek flowing into Little Cacapon River, Hampshire Co., W. Va., 64,817. South Fork Shenandoah River, near Luray, Va., 64,819. Also York Furnace, Pa. (Stone).

One lot, 64,807, shows a strong tendency toward the obeseness so characteristic of the transition forms between *heterostropha* and *ancillaria* found at Philadelphia and Washington. All of the others are very near the type of *heterostropha*.

#### Family VIVIPARIDÆ.

##### Genus CAMPELOMA Rafinesque.

##### *C. decisum* Say.

Potomac River at Hancock, Md., 64,751. Potomac River at Cherry Run, W. Va., 64,752. Typical at both localities. Stone collected it at York Furnace, York Co., Pa., with *Lioplax subcarinata*.

#### Family AMNICOLIDÆ.

##### Genus AMNICOLA G. & H.

##### *A. limosa* Say.

Very numerous in the canal at Hancock, Md., 64,755. Conecocheague River, west of Hagerstown, Md., 64,756 (small form). Also found at York Furnace, York Co., Pa., by Witmer Stone.

##### Genus GILLIA Stimp.

##### *G. altilis* Lea.

Canal at Hancock, Md., 64,782. Potomac River, at Cherry Run, W. Va., 64,781.

An abundant species throughout the drainage of the Chesapeake and Delaware Bays. Stone found it at York Furnace, York Co., Pa.



Genus **BYTHINELLA**, Auct.**B. nickliniana** Lea.

Conecocheague River, west of Hagerstown, Md., 64, 757.

Family **PLEUROCERIDÆ**.Genus **ANCULOSA** Say.**A. carinata** Brug.

This species is the characteristic mollusk of perennial streams in the Chesapeake Bay river-system. It has been found only in waters of this drainage, being unknown in the adjacent Delaware system on the north-east, in the Ohio system on the west, and in streams emptying into the Atlantic to the south of Chesapeake Bay.

*Anculosa* being essentially a trans-Alleghenian genus, we may with considerable confidence surmise that the ancestors of *A. carinata* were introduced into the head waters of the Potomac from some creek of the Ohio system, and from this colony spread throughout the Chesapeake drainage. The fact that it inhabits the James River and other Virginian streams which are now isolated from the Potomac and Susquehanna by a long stretch of salt water, indicates that since the introduction of *Anculosa*, and the differentiation of the species *carinata*, the Chesapeake region has been much more elevated than it is at present. *Anculosa* can endure neither salt nor slow-flowing water; and it must have spread to these various streams at a time when the united waters of the Susquehanna, Potomac, Rappahannock and James Rivers flowed in one mighty stream to the Atlantic. It may be suggested that the distribution has been accomplished overland; but this is highly improbable; for if so, why is the species so strictly limited to the Chesapeake system? Why has it not invaded the Delaware-Schuylkill drainage, which offers equally favorable stations, and is separated by but a few miles from the eastern tributaries of the Susquehanna? We must conclude that *Strepomatidae* require as a rule actual water communication for their spread from stream to stream. The exceptions are probably rare and unimportant.

The presence of this species in the headwaters of the Roanoke River at the hamlet of Lafayette, Montgomery Co., Va., is readily accounted for by the close proximity of the creeks forming the head of the James and those flowing into the Roanoke. Some time a

rivulet inhabited by *Anculosa* was "stolen" from the James by the Roanoke drainage, thus transferring the species.<sup>2</sup>

*Goniobasis virginica* is apparently a much older resident of the eastern country. It ranges from the Connecticut River (at Deep River, Conn.) to middle Virginia. The genus *Goniobasis* is known to be a much more ancient group geologically.

The distribution of *Anculosa carinata* is pretty thoroughly known by the localities given in Tryon's monograph, and the specimens in the collection of the Philadelphia Academy and the U. S. National Museum.<sup>3</sup> It extends northward to the headwaters of the Susquehanna in New York State. Both of the collections named possess specimens said to be from regions outside of the Chesapeake drainage, such as "Ohio," "Lake Erie," etc., and DeKay reports it from "Lake Champlain;" but these localities are, there is not much doubt, false. The older collectors were not so punctilious about correct habitats for their shells as we have now learned to be; and in the absence of confirmation by later collections the evidence of these old labels must be held insufficient. Lakes Champlain and Erie, and the State of Ohio, are now well known to many ardent and reliable students of conchology, and such a conspicuous shell as *A. carinata* would not be overlooked by them.

The following localities are represented in the collections made by Mr. Ives and myself:

Susquehanna River, York Co., 62,820, collected by Witmer Stone. Specimens small, 8-10 mm. long. Apices much eroded.

Conecocheague River, west of Hagerstown, Md., 64,757, under slabs and flakes of shale in rapid current; specimens rather small and black-brown or by transmitted light dark-green; the last whorl mostly rounded. Another lot, 64,768, collected from the upper surfaces of stones along the shore at the same place, averages much larger. The specimens are light olive-colored. Apices perfect or nearly so.

Licking Creek, Md., on black limestone, 64,841.

Flintstone Creek, Flintstone, Allegheny Co., Md., 64,769. Specimens nearly black and acutely keeled. Apices entire, living on the under surface of stones.

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<sup>2</sup> See instances cited in *Science*, July 1893, p. 36.

<sup>3</sup> Mr C. T. Simpson has kindly furnished me with a list of localities represented in the National Museum.

Evitt's Creek, near Cumberland, Md., 64,766. Color light-brown or black-brown. Apices entire. On the under surface of stones.

Potomac River, Hancock, Md., 64,771. Shell compact, the last whorl rounded; dark and usually banded with black; columella black; spires much eroded. Size generally large. Another lot, taken a few miles above Hancock 64,776, is the same in character but smaller.

Potomac River at Cherry Run, Morgan Co., W. Va., 64,770. Shells large, very dark and having a black-brown basal band and sometimes a sutural band. Last whorl rounded. Apex somewhat eroded, but much less so than in the Hancock shells.

South Branch of Potomac River, near Romney, W. Va., 64,760 and 64,759. Shells small, short, and acutely keeled.

South Branch Potomac, near Springfield, Hampshire Co., W. Va., 64,763. Specimens small, many not keeled upon the last whorl.

Cacapon River, Wardensville, Hardy Co., W. Va., 64,773. Specimens mostly small, dark colored, often three-banded. Very numerous on stones.

Creek affluent to Cacapon River, near Wardensville, 64,765. Specimens very small, globose, not keeled; color dark, mostly 3-banded.

Lost River, 4 miles from Wardensville, 64,774.

Warm Spring Creek, about one-half mile from its mouth, Morgan Co., W. Va., 64,764. Specimens very large (length 16 mm.), acutely keeled, light-brown, but covered with a black coating; apices mostly perfect. The specimens from the Potomac at the mouth of this creek differ from these in being generally unkeeled and much eroded.

Patterson's Creek, Mineral Co., W. Va., 64,754. Specimens small, mostly keeled. Another set, 64,753, from a "Run" affluent to the same creek, consists of larger shells.

Big Pass Creek, west of Massanatten Mt., Shenandoah Co., Va., 64,775. Specimens large and globular, the adults without trace of the keel, and light-brown.

North Fork of Shenandoah River, about 3 miles S.-E. of Woodstock, Va., 64,777. Shells small.

South Fork of Shenandoah River, 3 miles west of Luray, Page Co., Va., 64,762. Rather small shells.

**A. dilatata** Conrad, var.

North River, at Sedan P. O., Hampshire Co., W. Va., 64,758. A curious elongated form, ecarinate even in the young, and with the basal "spout" almost obsolete. The specimens may perhaps be referable to *A. corpulenta*, described from Dan River, N. C. A large series was collected.

**Genus GONIOBASIS** Lea.

**G. virginica** Gmel.

Potomac River at Hancock, Md., 64,778. Canal at Hancock, 64,779. Potomac River at Cherry Run, W. Va., 64,780. Also York Furnace, York Co., Pa. (Stone).

Both smooth and striated specimens occur, indiscriminately mingled, as is the case elsewhere wherever I have collected this species. Nearly all of the smooth examples are conspicuously two-banded, as are many of the striated ones also.

This species is found throughout the larger streams of the Potomac drainage and north to New York and Connecticut, but the southern limit of its range has not been accurately determined.

**Family VALVATIDÆ.**

No specimens were found by us in Maryland. Mr. Stone collected *Valvata tricarinata* Say and *V. bicarinata* Lea at York Furnace, York Co., Pa.

**Family CYRENIDÆ.**

**Genus SPHÆRIUM** Scop.

**S. striatinum** Lam.

The most abundant and commonly distributed species throughout the Middle States. Specimens were taken at Gettysburg, Pa., in Piny Creek, 64,831. Conecocheque River west of Hagerstown, Md., 64,833. Potomac River at Cherry Run, W. Va., 64,829. Warm Spring Creek, Morgan Co., W. Va., 64,832. South Fork of the Shenandoah, west of Luray, Va., 64,830.

**S. sulcatum** Lam.

Piny Creek, Gettysburg, Pa., 64,842.

**S. fabale** Prime.

Town Creek, Allegheny Co., Md., 64,834. Warm Spring Creek, Morgan Co., W. Va., 64,843.

**Family UNIONIDÆ.****Genus UNIO** Retz.**U. complanatus** Sol.

Conecocheague River, west of Hagerstown, Md., 64,824. Sideling Creek, between Allegheny and Washington Counties, Md., 64,825. Potomac River at Hancock, Md., 64,822. Potomac River at Cherry Run, W. Va., 64,823.

**U. productus** Con.

Sideling Creek, between Allegheny and Washington Counties, Md., 64,827.

**U. tappanianus** Lea.

Sideling Creek, Md., 64,820.

Sideling Creek, at the time of our visit (Sept. 1892) was merely a chain of pools connected by a slender stream of water running among, rather than over, the rocks of dry intervals. The pools had rocky and muddy bottoms, and in them no less than five species of Unionidæ were found, represented by many individuals. No *Anculosa* were found here.

Stone found *U. cariosus* and *U. radiatus* at York Furnace, York Co., Pa.

**Genus MARGARITANA** Schum.**M. marginata** Say.

Conecocheague River, west of Hagerstown, Md., 64,820. Potomac River at Hancock, Md., 64,819. Sideling Creek, Md., 64,821. Potomac River at Cherry Run, Morgan Co., W. Va., 64,818.

**M. undulata** Say.

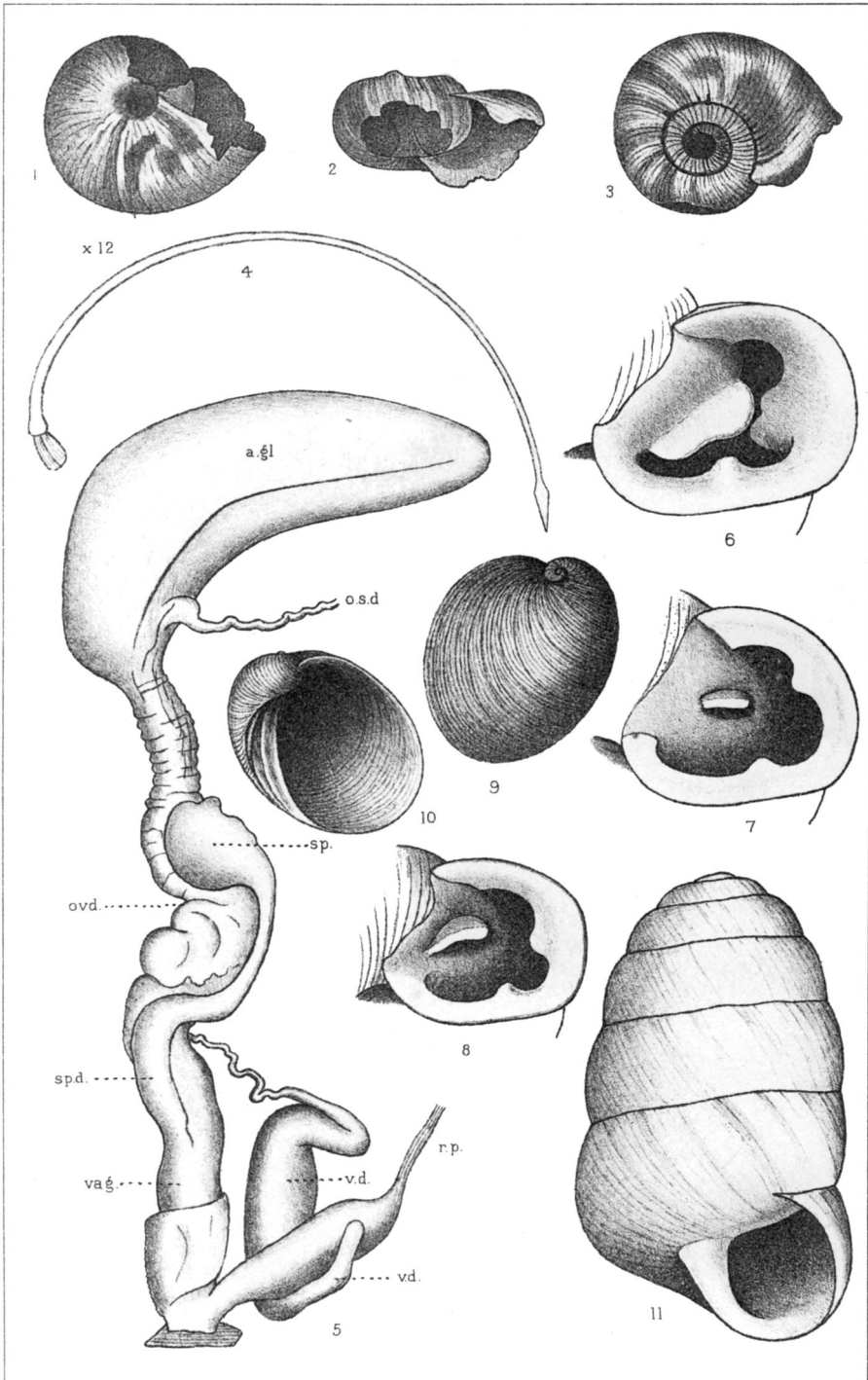
Sideling Creek, Md., 64,828.

**Genus ANODONTA.**

Mr. Witmer Stone found *A. fluviatilis* Dillw. and *A. subcylindrica* Lea at York Furnace, York Co., Pa.

## EXPLANATION OF PLATE I.

- FIGS. 1, 2, 3. *Paryphanta lignaria* Hutton. Three views of the type specimen, drawn by Mr. H. Suter.
- FIG. 4. Dart of *Gastrodonta ligera* Say. Extracted by Mr. Robert Walton from a Philadelphia specimen.
- FIG. 5. Genitalia of *Omphalina fuliginosa* Griff. Specimen from York Furnace, Pa., collected by Mr. Witmer Stone.
- FIG. 6. *Polygyra tridentata fraudulenta* Pils. Type. Specimen from Morgan Co., W. Va., opposite Hancock.
- FIG. 7. *Polygyra tridentata* Say. Typical. Specimen from Philadelphia.
- FIG. 8. *Polygyra tridentata justidens* Pils. Specimen from Cave Town, Md.
- FIGS. 9, 10. *Velutina grandis* E. A. Smith. Two views of a specimen collected by Prof. Angelo Heilprin at McCormick Bay, western Greenland. Natural size.
- FIG. 11. *Pupa polvonensis* Pilsbry. Nicaragua. Front view of type specimen, magnified 30 diameters.



Pilsbry del.

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PILSBRY, POTOMAC VALLEY MOLLUSCA.